

It is respectfully submitted that the problems of the admitted prior art and those addressed by Kitahiro are very different and, additionally, the principle by which Gaynes et al. achieves reduced substrate cracking is very different from that of the invention and Kitahiro; both to a degree that modification of any of the applied prior art in accordance with the teachings of any or all of the remaining applied prior art would preclude operation in the intended manner. Thus such a proposed modification is improper under the well-accepted precedent of *In re Gordon*, 221 USPQ 1125 (Fed. Circ., 1984). Further, it is respectfully submitted in this regard, that the asserted motivation for the proposed modification is illusory and that the Examiner has thus failed to make a *prima facie* demonstration of the obviousness of any claim in the application. Moreover, it follows that, since no *prima facie* demonstration of the propriety of the asserted grounds of rejection has been made, the finality of the present action is premature and improper.

Specifically, the substrate 12 of the admitted prior art print head must have a significant thickness in order to accommodate the ink passages, particularly ink grooves 16 and bore holes 18 to evenly supply ink to the ink paths formed by partition walls 15 and then to the orifices 20. The thickness of the substrate also serves to maintain flatness of the print head face and the orifice array geometry which is critical in ink jet printers. Moreover, it is the formation of these passages by removal of substrate material which weakens the substrate, especially since ink grooves 16 must extend across substantially the entire face of the print head and bore holes 18, together with ink grooves 16 extend through the entire thickness of substrate 12 and thus tends to concentrate bending forces which may thus cause cracking of the substrate, particularly during manufacture as noted, for example, in the

paragraph of the specification bridging pages 19 and 20. Note also that the sources of heat and stress which cause cracking that are enumerated on page 20, lines 3 - 11 are all incidents of the manufacturing process.

The art of ink jet print heads is well-developed and substrate thicknesses considered to be substantially optimum in that art are (presumably) currently in use. Therefore, it is respectfully submitted that the ink jet printer and print head art does not supply motivation for reducing thickness of the substrate 20, as the Examiner suggests. On the contrary, any significant reduction of the thickness of substrate 12, particularly a reduction comparable to that of Kitahiro would preclude the formation of such passages and the ability of the structure of the admitted prior art to function as an ink jet print head or use of the same in an ink jet printer. Indeed, if the substrate thickness were to be reduced in accordance with Kitahiro after formation of the ink grooves 16, the substrate would be separated into strips at the locations of the ink grooves 16 and rendered useless for any purpose. Therefore, it is respectfully submitted that the motivation for modification suggested by the Examiner is illusory and improper under the precedent of *In re Gordon, supra*.

Conversely, while Kitahiro teaches addition of a reinforcing layer (which could be but need not be metal) when a substrate must be made thin, the important functional element of Kitahiro is not the reinforcing layer 4 but layer 22 which holds the substrate flat while thickness is reduced and the reinforcing layer applied before layer 22 is removed. In this regard, it should be appreciated that the extreme degree of substrate thickness reduction engenders flexibility and, consequently, a degree of protection of the substrate from cracking and/or

breakage of the substrate which has utility in a smart card which could be bent during use but is deleterious to the geometry which must be maintained for good performance of a print head. (Thus, conversely to the above discussion of the impropriety of modification of a prior art print head to reduce thickness, the structure of Kitahiro would be completely inappropriate for modification that would be necessary to form a print head and, moreover, the space required for ink passages would greatly reduce the integrated circuit element density and storage capacity which are necessary in a "smart card", as discussed on page 2, last several paragraphs, of Kitahiro. In this regard, it should be noted that Kitahiro discloses at page 3, third paragraph of the translation, that if a reinforcing layer (again, not necessarily metal) is applied in accordance with prior methods (e.g. without using thick layer 22) the substrate is bent "into a convex curve" and that it is not the substrate which is damaged thereby but *the integrated circuit which is formed on the substrate*. In the previous paragraph of Kitahiro, damage is attributed to bending of the card while inserting the substrate into the card. The contemplated damage to the substrate is breakage along a cleavage plane (which it is a principal function of the reinforcing layer of Kitahiro to *interrupt* while retaining a degree useful flexibility of the substrate) rather than providing a structure which will supply additional strength where the substrate has been weakened through removal of material from the substrate to form ink passages. In this connection, neither the admitted prior art nor Kitahiro contains any teaching leading to an expectation of success in increasing manufacturing yield of ink jet print heads by the inclusion of a metal layer and thus neither provides evidence of a level of ordinary skill in the art which would support the conclusion of obviousness which the

Examiner has asserted. Therefore, it is respectfully submitted that no *prima facie* demonstration of obviousness can be made based on the admitted prior art and Kitahiro.

Gaynes et al. mentions a layer for reinforcement of a semiconductor chip that can be made of nickel, among several other metals and mentions particular ranges of thicknesses which coincide with a portion of the range of thickness by which the invention can be successfully practiced (but not, in fact, the preferred range for the invention noted at page 23, line 1), the principle by which a reduction in substrate cracking is very different from that of the invention or that of Kitahiro (which also greatly differ from each other as discussed above). As discussed at column 3, lines 30 to 64, Gaynes et al. provides reduction of substrate breakage not by adding a structure which provides significant additional strength, but by providing a structure which imposes forces on the chip which approximately balance the forces placed on the opposite side of the chip due to mismatch of coefficients of thermal expansion between the chip and the organic substrate on which the chip is mounted. (By the same token, the principle by which Gaynes et al. provides its meritorious function is not available in the case of a thin substrate of Kitahiro and vice-versa and thus this combination is also improper under *In re Gordon, supra.*) It is significant in this regard to note that the cracking to which Gaynes et al. is directed is due to thermal cycling of the integrated circuit after it is placed in service rather than in manufacture of the integrated circuit (as in the case of the invention) or assembly into another structure (as in the case of Kitahiro).

Therefore, it is respectfully submitted that Gaynes et al. is substantially less relevant or analogous to the invention and to other applied prior

art (which is also substantially less relevant to the invention and less analogous to each other) than asserted by the Examiner and, in any event, Gaynes et al. does not supplement the combination of the admitted prior art and Kitahiro at the points of deficiency to answer the claimed subject matter as discussed above. As with the combination of the admitted prior art and Kitahiro, the combination of the admitted prior art, Kitahiro and Gaynes et al. does not lead to an expectation of success in avoiding cracking and/or breakage of a substrate where it has been weakened by removal of substrate material by placement of metal on one side of the substrate opposite that at which most material has been removed consonant with the formation of an ink jet print head.

Therefore, it is respectfully submitted that the Examiner has not made and cannot make a *prima facie* demonstration of obviousness of any claim in the application based on a combination of the admitted prior art, Kitahiro and Gaynes et al. At best, the Examiner has made a hindsight reconstruction based on the teachings of the present application rather than the principles of operation of the prior art relied upon and asserted an illusory and, in fact, undesirable purpose as motivation therefor while proposing modifications which would render each reference unsuitable for its intended function if so modified. As pointed out above, such proposed modifications are improper and clearly without motivation for that reason under the precedent of *In re Gordon, supra*.

Accordingly, the grounds of rejection asserted by the Examiner are clearly seen to be in error and improper, as is the finality of the present official action since no *prima facie* demonstration of obviousness has been made. Accordingly, withdrawal of the finality of the present official action, full reconsideration and withdrawal of the rejections of

record and allowance of the application are respectfully requested and clearly warranted as discussed above. Further, should the grounds of rejection be changed in a further official action, it is respectfully submitted that any such further official action cannot properly be made final since neither this response nor the preceding response have amended the claims beyond addition of new claim 13 in the previous response.

Since all rejections, objections and requirements contained in the outstanding official action have been fully answered and shown to be in error and/or inapplicable to the present claims, it is respectfully submitted that reconsideration is now in order under the provisions of 37 C.F.R. §1.111(b) and such reconsideration is respectfully requested. Upon reconsideration, it is also respectfully submitted that this application is in condition for allowance and such action is therefore respectfully requested.

If an extension of time is required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



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